

From Scott Lee @ Paia

Vocoder Noise Reduction Modification

This mod for the 6710 Vocoder virtually eliminates an otherwise objectionable amount of hiss from the mono and stereo outputs. A voltage follower op-amp circuit inserts at the input to each filter, isolating the IN1 and IN2 level controls from the eight filters they feed. Each follower drives its own load instead of the variable resistance of the level controls driving all eight. This means more signal with a flatter response gets to the output of the bands, there's more dynamic range, and the signal to noise ratio is improved. Additionally, the summing resistors to the mono/stereo output amps can be larger which lowers the gain of these stages contributing to lower noise.

A Component PC Board (general purpose) available at Radio Shack (276-168b) makes it easy to add the four ICs and wiring for the mod. The board is full of holes and soldering points/grids optimized for wiring IC circuits. Sockets for the four ICs can be soldered and connections between the output pin to the inverting (-) input pin is easily made with a wire jumper. Two busses facilitate common circuit connections and the IN1 and IN2 taps can distribute to IC pins on these. The IN1 and IN2 taps, the buffered outputs, and the V+/V- power supplies connect using #22 insulated, stranded wire (about a foot for each connection with the mod board situated behind and at about the middle of the vocoder circuit board).

Notice on the vocoder that the IN1 and IN2 level controls wire to circuits from their #2 terminals (via wire P for IN1 and wire Y for IN2) and these two circuits each have eight 4700 ohm (yellow-violet-red-gold) spaced across the board which are the inputs to the band filters. Remove and discard the P and Y wires; they'll be replaced with new ones to the mod board. Desolder and lift the ends of the 4700 ohm filter input resistors from the circuits that tie them to the P and Y wiring points; they become the connecting points for the mod board buffer outputs.

The summing resistors which set the mix of the bands should be replaced before the mod board and its wiring are added. Remove resistors R31, R32, R3, R4, R33, R34, R5, and R35. Install 33k (orange-orange-orange-gold) resistors at all these locations except R5 and R35. Install a 22k (red-red-orange-gold) at R5 and a 68k (blue-gray-orange-gold) at R35. When making the connections to the filter input resistors with the wires from the buffers, a piece of tubing can be slipped over the wire before it's soldered to the end of the resistor so the joint can be covered/insulated.

Finally, wire the mod board to the points on the vocoder. When making the connections to the filter input resistors with the wires from the buffers, a piece of tubing can be slipped over the wire before it's soldered to the end of the resistor so the joint can be covered/insulated. Make the V+ and V- connections from the mod board to the vocoder power supply (there is no ground circuit to the mod board). Test operation.

If it didn't look like you had a plate of spaghetti in front of you before, it should now! Enjoy.

Scott Lee - Paia tech

mod parts list:

1 component pc board
4 14 pin IC sockets
4 TL 084 quad op-amps
6 33k resistors
1 22k resistor
1 68k resistor
appx. 20 ft. #22 ins. stranded wire

Example for one band (note: i'm doing the best i can ascii-izing this :) - justin)

```

      6|-\  |  R8
      | >7--+---vvv----C30, 31
R26-2 -----5|+/  
IN1 level      IC13
```

```

      6|-\  |  R9
      | >7--+---vvv----C32, 33
R40-2 -----5|+/  
IN2 level      IC11
```

```

R11-,-=|  |=,-R13   IC 11
'==|  |='  
R40-2-=|  |=-R40-2  
V+-=|TL084|=-V-  
R40-2-=|  |=-R40-2  
_,=|  |=,_  
R9 '==|  |=' R15  
-----
```

```

R19-,-=|  |=,-R21   IC 12
'==|  |='  
R40-2-=|  |=-R40-2  
V+-=|TL084|=-V-  
R40-2-=|  |=-R40-2  
_,=|  |=,_  
R17 '==|  |=' R23  
-----
```

```

R10-,-=|  |=,-R12   IC 13
```

'=| |='
R26-2-=| |=-R26-2
V+,-=|TL084|=-V-
R26-2-=| |=-R26-2
,=| |=,
R8 '=| |=' R14

R18-,=| |=-,R20 IC 14
'=| |='
R26-2-=| |=-R26-2
V+,-=|TL084|=-V-
R26-2-=| |=-R26-2
,=| |=,
R16 '=| |=' R22
